

REMARKS

Reconsideration of this application, in view of the foregoing amendment and the following remarks, is respectfully requested.

Claims 1-52 were originally presented for consideration in this application. Claims 2 and 49 have been canceled above. Accordingly, claims 1, 3-48 and 50-52 are currently pending in this application.

The examiner's indication that claims 9-12, 23, 25, 30, 40 and 43 contain allowable subject matter is noted with appreciation.

The following rejections and objections were set forth in the Office Action:

1. Claims 9-12, 23, 25, 30 and 40 are objected to for depending from a rejected base claim;
2. Claims 1 and 44 stand rejected under 35 USC §102(b) as being anticipated by U.S. Patent No. 3,970,877 to Russell et al.;
3. Claims 1 and 44 stand rejected under 35 USC §102(b) as being anticipated by U.S. Patent No. 4,491,738 to Kamp;
4. Claims 1, 2, 6-8, 13, 21, 22, 24, 26-28, 31-39, 42 and 44-50 stand rejected under 35 USC §102(b) as being anticipated by U.S. Patent No. 5,362,984 to Schultz et al.;
5. Claims 1-6, 13 and 44 stand rejected under 35 USC §102(b) as being anticipated by U.S. Patent No. 5,965,964 to Skinner et al.; and
6. Claims 14-20, 29, 41, 51 and 52 stand rejected under 35 USC §103 as being unpatentable over Schultz in view of U.S. Patent No. 3,610,216 to Braun.

By the foregoing amendment, the following actions have been taken in response to these rejections and objections:

1. Claims 9, 23, 25, 30, 40 and 43 have been rewritten in independent form to thereby place these claims and their dependents in condition for allowance; and
2. Claims 1, 21 and 44 have been revised to more clearly set forth their patentable distinctions over the applied references.

Turning now to the merits of the claims, the rejections of claims 4 and 5 as being anticipated by Skinner are respectfully traversed. These claims have been rewritten in independent form above. Claim 4 recites that electricity is generated in response to a decrease in pressure in an annulus formed between a tubular string and a wellbore. Claim 5 recites that electricity is generated in response to both an increase and a decrease in pressure in the annulus. These limitations are not disclosed in the Skinner reference.

Instead, the Skinner reference describes (and illustrates in FIGS. 9B & 10B) an electrical power generator which operates in response to a differential pressure between an annulus and the interior of a tubular string. The Skinner electrical power generator operates when the annulus pressure is greater than pressure in the interior of the tubular string.

Skinner does not describe an electrical power generator which operates in response to a decrease in pressure in an annulus, and Skinner clearly does not describe an electrical power generator which operates in response to both an increase and a decrease in pressure in the annulus. Therefore, the examiner is respectfully requested to withdraw the rejections of claims 4 and 5.

Regarding the rejections of claims 27 and 28 as being anticipated by Schultz, these rejections are respectfully traversed. These claims have been rewritten in independent form above. Claim 27 recites first and second check valves in relation to a passage which provides fluid communication between first and second chambers. The

first and second chambers are in fluid communication with the annulus and an accumulator, respectively, and with respective first and second sides of a piston.

Claim 28 recites that the accumulator is in fluid communication with the annulus via a flow restrictor. A change in annulus pressure is directly communicated to the first side of the piston, but the restrictor delays communication of the change in annulus pressure to the second side of the piston.

The Schultz reference does not describe the system recited in either of claims 27 and 28. The examiner identifies the piston 150 of Schultz as being the piston recited in the claims. This piston 150 is not in fluid communication with the annulus 40 via a check valve, nor is this piston in fluid communication with an accumulator via another check valve.

The passage recited in claim 27 (which provides fluid communication between chambers in fluid communication with the annulus and the accumulator) is also not found in the Schultz reference. The flow restrictor recited in claim 28 (which delays communication of a change in annulus pressure to the piston) is also not found in the Schultz reference. Therefore, the examiner is respectfully requested to withdraw the rejections of claims 27 and 28.

Regarding the rejection of claim 1 as being anticipated by each of the Schultz, Russell, Kamp and Skinner references, this claim has been amended above to distinguish the claim from these references. Claim 1 now recites that a piston displaces in response to annulus pressure increases and decreases, and electric power is generated when the piston displaces in response to both annulus pressure increases and annulus pressure decreases. None of the applied references describes these features of the invention. Therefore, the examiner is respectfully requested to withdraw the rejections of claim 1 and its dependents.

Regarding the rejection of claim 21 as being anticipated by the Schultz reference, this claim has been amended above to distinguish the claim from this reference. Claim

21 now recites that a generator generates electricity in response to rotation of a hydraulic motor both when well pressure increases and when well pressure decreases, the hydraulic motor rotating in response to displacement of hydraulic fluid by a structure which displaces both when well pressure increases and when well pressure decreases. None of the applied references describes these features of the invention. Therefore, the examiner is respectfully requested to withdraw the rejections of claim 21 and its dependents.

Regarding the rejection of claim 31 as being anticipated by the Schultz reference, this rejection is respectfully traversed. Claim 31 recites the steps of changing pressure in the well proximate an accumulator, and flowing well fluid through an opening of the accumulator in response to the pressure changing step. Schultz does describe an accumulator in the FIG. 3 embodiment, but the accumulator receives pressure from the well annulus. Well fluid is not flowed through an opening of Schultz's accumulator in response to a change in pressure in the well. Therefore, the examiner is respectfully requested to withdraw the rejections of claim 31 and its dependents.

Regarding the rejections of claim 44 as being anticipated by each of the Schultz, Russell, Kamp and Skinner references, this claim has been amended above to distinguish the claim from these references. Claim 44 now recites that a piston displaces both when the annulus pressure increases and when the annulus pressure decreases, and that electric power is generated in response to the piston displacement both when the annulus pressure increases and when the annulus pressure decreases. None of the applied references discloses these features of the invention. Therefore, the examiner is respectfully requested to withdraw the rejections of claim 44 and its dependents.

Regarding the rejections of claims 14-20, 29, 41, 51 and 52 as being obvious over Schultz in view of Braun, these rejections are respectfully traversed. Claims 14, 15, 18, 20, 29, 41, 51 and 52 have been rewritten in independent form above. The basis for the

obviousness rejections as stated in the Office Action is that it would have been obvious to provide the rack and pinion mechanism of Braun with the Schultz electrical power generation system.

Claim 14 recites that a rack and pinion mechanical linkage is interconnected between a piston and a generator, the piston displacing in response to a change in annulus pressure. Schultz describes a piston which is displaced by annulus pressure, but the piston does not displace in response to a change in annulus pressure to generate electricity. Thus, the applied references do not describe all of the features of the invention recited in claim 14.

Braun describes a rack and pinion-type synchronizing and balancing mechanism which may be interconnected between an internal combustion engine and an electrical generator. However, a person skilled in the art would definitely not be motivated to combine this mechanism with the Schultz system, for to do so would make the Schultz system unsuited for its intended purpose.

As recognized in MPEP §2143.01, “The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. ... Although a prior art device may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so.”

The Braun device is a complex arrangement of gears and counterbalancers intended to balance the stroke times of a dual power piston arrangement. A person of ordinary skill in the art in the process of designing a linkage between a piston displaced by well pressure and a generator would not even consider using the Braun device, due to its complexity and unsuitability for the application. In particular, a person of ordinary skill in the art would certainly not use the Braun device with the Schultz system, since the Braun device is designed to work with a dual piston driven by explosive forces alternately applied to its opposite sides.

In addition, there is no teaching, suggestion or motivation expressed in the references themselves for making the proposed combination. Nowhere in the references is there any suggestion or motivation expressed for making the combination proposed

by the examiner. Therefore, for this additional reason, the examiner is respectfully requested to withdraw the rejection of claim 14.

Regarding the rejection of claim 15 as being obvious over Schultz in view of Braun, this rejection is respectfully traversed. This claim has been rewritten in independent form above. Claim 15 recites that the mechanical linkage drives the generator in a first direction when the change in annulus pressure is an increase in annulus pressure, and the mechanical linkage drives the generator in a second direction opposite to the first direction when the change in annulus pressure is a decrease in annulus pressure.

Schultz describes a piston which is displaced by annulus pressure, but the piston does not displace in response to a change in annulus pressure to generate electricity. Thus, the applied references do not describe all of the features of the invention recited in claim 15.

Braun does describe a mechanical linkage for driving an electrical generator, but neither Schultz nor Braun discloses driving a generator in opposite directions when annulus pressure is alternately increased and decreased. Furthermore, for the reasons stated above with regard to the obviousness rejection of claim 14, it would not be obvious to a person of ordinary skill in the art to modify the Schultz system to include the Braun device. There is no motivation or suggestion to make such a combination, and such modification of the Schultz system would make it unsuitable for its intended purpose. Therefore, the examiner is respectfully requested to withdraw the rejections of claim 15 and its dependents.

Regarding the rejections of claims 18 and 52 as being obvious over Schultz in view of Braun, these rejections are respectfully traversed. These claims have been rewritten in independent form above. Each of these claims recites that a first portion of a generator displaces with a piston relative to a second portion of the generator. The piston displaces in response to a change in annulus pressure.

Braun does describe a piston connected to a first portion of a generator, but the synchronizing and counterbalancing rack and pinion mechanism is interconnected between the piston and the generator, and so the first portion of the generator does not displace with the piston. Instead, the rack and pinion mechanism causes the first portion of the generator to displace opposite to the piston. In addition, Schultz describes a piston which is displaced by annulus pressure, but the piston does not displace in response to a change in annulus pressure to generate electricity. Thus, the applied references do not describe all of the features of the invention recited in claims 18 and 52.

Furthermore, for the reasons stated above with regard to the obviousness rejection of claim 14, it would not be obvious to a person of ordinary skill in the art to modify the Schultz system to include the Braun device. There is no motivation or suggestion to make such a combination, and such modification of the Schultz system would make it unsuitable for its intended purpose. Therefore, the examiner is respectfully requested to withdraw the rejections of claim 18 and its dependent, and claim 52.

Regarding the rejection of claim 20 as being obvious over Schultz in view of Braun, this rejection is respectfully traversed. This claim has been rewritten in independent form above. Claim 20 recites that a rectifier is interconnected between the generator and a power consuming electrical circuit. The generator generates electricity in response to displacement of a piston, the piston displacing in response to a change in annulus pressure.

Schultz does not describe changing the annulus pressure and thereby displacing a piston to operate a generator. Instead, Schultz's piston is displaced in one embodiment by a pressure differential between the annulus and the interior of a tubular string or chamber. Thus, the applied references do not describe all of the features of the invention recited in claim 20.

Furthermore, for the reasons stated above with regard to the obviousness rejection of claim 14, it would not be obvious to a person of ordinary skill in the art to

modify the Schultz system to include the Braun device. There is no motivation or suggestion to make such a combination, and such modification of the Schultz system would make it unsuitable for its intended purpose. Therefore, the examiner is respectfully requested to withdraw the rejection of claim 20.

Regarding the rejection of claim 29 as being obvious over Schultz in view of Braun, this rejection is respectfully traversed. Claim 29 is rewritten in independent form above. Claim 29 recites that the generator generates direct current electricity having one polarity when annulus pressure is increased, and the generator generates direct current electricity having an opposite polarity when annulus pressure is decreased.

Schultz does not describe an electrical generator which generates electricity in response to both an increase in annulus pressure and a decrease in annulus pressure. As noted above, the Schultz system in one embodiment operates in response to a pressure differential between the annulus and the interior of a tubular string or chamber. Thus, the applied references do not describe all of the features of the invention recited in claim 29.

Furthermore, for the reasons stated above with regard to the obviousness rejection of claim 14, it would not be obvious to a person of ordinary skill in the art to modify the Schultz system to include the Braun device. There is no motivation or suggestion to make such a combination, and such modification of the Schultz system would make it unsuitable for its intended purpose. Therefore, the examiner is respectfully requested to withdraw the rejection of claim 29.

Regarding the rejections of claims 41 and 51 as being obvious over Schultz in view of Braun, this rejection is respectfully traversed. These claims are rewritten in independent form above. Each of these claims recites that a piston displaced by changing pressure in the annulus operates a mechanical linkage interconnected between the piston and a generator.

As discussed above, Schultz does not describe such a system wherein annulus pressure is changed to displace a piston and thereby generate electricity. The Schultz system instead relies on a pressure differential between the annulus and the interior of a tubular string or chamber. Thus, the applied references do not describe all of the features of the invention recited in claim 41.

Furthermore, for the reasons stated above with regard to the obviousness rejection of claim 14, it would not be obvious to a person of ordinary skill in the art to modify the Schultz system to include the Braun device. There is no motivation or suggestion to make such a combination, and such modification of the Schultz system would make it unsuitable for its intended purpose. Therefore, the examiner is respectfully requested to withdraw the rejections of claims 41 and 51.

In view of the foregoing amendment and remarks, all of the claims now pending in this application are now seen to be in a condition for allowance. A Notice of Allowance of claims 1, 3-48 and 50-52 is therefore earnestly solicited.

The examiner is hereby requested to telephone the undersigned attorney of record at (972) 516-0030 if such would further or expedite the prosecution of the instant application.

Respectfully submitted,

KONNEKER & SMITH, P.C.



Marlin R. Smith
Attorney for Applicants
Registration No. 38,310

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660 North Central Expressway
Suite 230
Plano, Texas 75074
(972) 516-0030

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on July 3, 2003
Charity Sait